

Hierarchy for Effective Lesson Planning: A Guide to Differentiate Instruction Through Material Selection

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Students studying to be teachers, henceforth called preservice teachers, face a variety of challenges when they enter the classroom for their required field experience. They face the responsibilities and pressures of the accountability movement where the lessons they plan must continue the momentum of the curriculum required by the state, district, school and classroom teacher. In other words, preservice teachers are trying their wings in a highly charged atmosphere of standards-based teaching and high-stakes testing. They must plan lessons for students with varying ability levels, varying language experiences, and varying cultural and language knowledge. Therefore, it is incumbent upon preservice teachers to seek multiple ways to meet the multiple needs of the students they teach. The planned selection of materials is one way to differentiate instruction for their students.

To document preservice teachers' planned use of materials, we analyzed 363 lesson plans, 977 total objectives, written by junior level K-12 education majors. We found that 61% of the objectives were to be taught by teacher talk and textbooks alone (Figure 1). Of the 39% of the objectives that were supported by visuals and concrete materials, the preservice teachers displayed the materials but did not offer any interaction to the students 55% of the time. Of the 977 objectives, preservice teachers planned to engage their students in hands-on multisensory experiences only 18% of the time. Teacher candidates were tethered to the notion that all one has to do to get students to learn is to tell them what they need to know (Figure 2). The shift from active teacher to active student has thrown many teacher candidates into a state of disequilibrium. The theories underlying differentiated instruction and multisensory learning that they had been learning in their university coursework did not match their own past experiences as students. Their prior classroom experiences eclipsed their newfound pedagogical knowledge that called for multiple ways to engage students in learning through materials. This documented need to redirect teacher candidates to plan lessons that facilitate active "hands-on, minds-on" student involvement (National Research Council, 1996) through relevant materials led to the development of an easy-to-follow two-part guide for lesson planning, (HELP) Hierarchy for Effective Lesson Planning (see Figures 3 and 4).

This article introduces HELP and examines the theoretical underpinnings that support the inclusion of materials in content-area lessons. We provide specific ways teachers can use HELP to facilitate the planning of multisensory lessons that support direct instruction, constructivist methods, and cooperative learning models at all levels of thinking. HELP ranks materials based on their authenticity beginning with the real world materials in their natural context. Less authentic materials are listed in descending order and include artifacts from the real world, representations of artifacts, pictures and visuals, written, and oral descriptions. As students become more removed from authentic materials, they are left with fewer sensory opportunities to support their thinking and learning. We seek to understand our world through personal concrete experiences and materials afforded to us through our culture. One must look only to the plethora of metaphors that occur in everyday language to understand people's dependence on linking concrete objects to abstract ideas. For example, teachers must *bridge* the difference between the students' prior knowledge and new learning. Pinker (2007, p. 238) stated,

“...the human mind can directly think only about concrete experiences: sights and sounds, objects and forces, and the habits of behavior and emotion in the culture we grow up in.”

HELP's Predecessors

The idea of a lesson planning hierarchy is the intellectual heir to the ideas of Dale (1954), Bruner (1966), and Piaget (1976). HELP includes materials available to teachers and relates them to multisensory learning. Though written at different times and for different purposes, each hierarchy ranks the presentation of materials from concrete to abstract. Dale (1954), the creator of the Cone of Experience, placed direct, purposeful experiences at the base of the cone and verbal experiences at the top (Figure 5). Like HELP, the Cone was meant to serve as a guide to the use of materials to support instruction and learning. Dale stated that teachers must "...help children learn what they find difficult by offering them all the ways of experiencing that relate to the specific subject" (Dale, 1954, p. 54).

Bruner (1966) also categorized materials according to their level of abstraction. He represented the possible presentation of materials in three ways, enactive, iconic, and symbolic. He believed that teachers must be aware of the different ways students can know something in order to shape their intellectual growth. Piaget's stages of cognitive development (1976) is embedded in Bruner's theory of instruction:

- The sensorimotor stage corresponds to Bruner's enactive stage where children's cognitive growth develops through direct actions with objects and living things in their world.
- The preoperational and concrete operational stages relate to Bruner's iconic stage where children's cognitive growth occurs through direct actions with objects that include manipulation such as organization, categorization, comparison, deconstruction, and reconstruction.
- The formal operational stage aligns with Bruner's symbolic stage where spoken words and written symbols are used to represent knowledge.

Bruner (1966) found that students of all ages moved easily from learning through concrete representations to the abstractions of written and oral language and then back again to the use of objects. Thus, a well-sequenced lesson enables students of all ages to use information gleaned from interactions with concrete objects to form and test hypotheses, engage in critical observations, make predictions, make judgments, and form conclusions. They are operating at the symbolic stage of representations where they use speech and printed words as well as icons to represent their thinking.

Learning Theories and Experiential Instruction

New learning is aided by students' knowledge of the real world. For the past 75 years, cognitive psychologists have studied schema theory to determine how isolated bits of information are organized and stored in memory (Bartlett, 1932). Information is added to existing folders, or in the case of new experiences, new folders (schemata) are created when there is an input of knowledge through one or more of the senses. The more senses involved in learning, the more ways information can be stored in memory.

Emotion and novelty are powerful instinctual forces that are catalysts for learning. Sylwester (2002) explains this correlation between emotion and learning by stating, "It is biologically impossible to learn something if we are not attending to it, and we do not attend to things that are not emotionally meaningful" (p. 24). The closer the materials used in lessons resemble the real world, the more likely they will evoke emotional responses based on the students' prior experiences and sense of wonder. Novel materials, or materials placed in unexpected places promote curiosity in the classroom setting. A large plant sitting in front of the classroom, a live rabbit, a skeleton attract attention and interest. Print and lecture alone may not provide the novelty necessary to evoke an emotional response from the students. Real-world materials, artifacts, and their representations can boost students' recall of meaningful experiences and prior knowledge that can be linked to new skills and concepts.

The involvement of students with the real world does not have to take an inordinate amount of time. A quick walk outside to feel the weather and view clouds, a trip down the hall to find parallel lines on the floor or to run toy cars along parallel lines to see whether they will ever collide can bring a lesson to life without a huge investment of time. These experiences can serve to promote inquiry, discovery, and focused attention to critical attributes that move students from casual mundane observations of their world to novel discoveries. The Theory of Multiple Intelligences (Gardner, 1983) addresses the importance of valuing and nurturing students' unique intelligences by enabling them to experience and interact with their world in a variety of ways. Before they enter school, infants and young children begin to learn language and gain rudimentary understandings of their world through authentic experiences.

In school children are expected to learn about their world through oral and written abstract symbols. The mismatch between the ways preservice teachers planned to teach and the ways students learned in the past is best expressed in Gardner's (1983) words, "...outside of schooled settings, children acquire skills through observation and participation in the contexts in which these skills are customarily invoked. In contrast, in the standard classroom, teachers talk, often presenting material in abstract symbolic form and relying on inanimate media such as books and diagrams in order to convey information" (p. 357).

The National Board for Professional Teaching Standards advocates the use of materials to facilitate active student learning throughout its Five Core Propositions. Proposition Two, *Teachers know the subjects they teach and how to teach those subjects to students*, exhorts teachers to "connect knowledge to real-world applications" and to "use and develop multiple teaching/learning strategies..." (NBPTS, 2005). To meet this proposition, it is important to consider all materials relevant to the lesson, and all the ways the materials can be used to engage students in learning.

The research base on the use of nonlinguistic materials extends to English language learners (ELLs). One of the research-based components of the Sheltered Instruction Observation Protocol (SIOP), an instructional model for teachers of ELLs, is *Comprehensible Input*. This refers to the presentation of information in multiple ways that include gestures, pantomime, movement, and realia (Vogt, Echevarria, & Short, (2010). The principles underlying the recommendations for instructing ELLs applies to native speakers as well. Anyone learning new concepts and vocabulary would benefit from the additional information that realia provides.

An Overview of HELP

To use the hierarchy during lesson planning, teachers must first review the learning goal. They keep the learning goal in mind as they look at the highest level in the hierarchy, "Real-world experiences." If it is not feasible to use real world experiences, they look at the next level of the hierarchy, "Real-world artifacts." Again, a judgment must be made as to whether the second level is appropriate for the learning goal. This process is repeated as preservice teachers consider each successive level of the hierarchy and select the highest level most feasible to support their learning objective.

With the goal of teaching for understanding, HELP is to be used as a guide or reminder to consider all possible materials and the way they can be used to promote students' physical and mental involvement in the lesson. Materials at each level of the hierarchy, including oral presentations and discussions, can serve a vital pedagogical role dependent upon the goals of instruction and the needs of the students. Two examples follow that illustrate how sensory involvement can vary in two lessons planned at the same level of HELP. Each example is followed by a brief explanation about the students' level of involvement in the lesson. Both lessons are based on the objective, "The students will identify characteristics of deciduous trees" and both lessons combine direct instruction with discovery or exploratory learning.

Teacher 1: The teacher took the class on a nature walk around the school. During the walk around the schoolyard, the teacher led a discussion about deciduous trees and told interesting facts about each tree.

Teacher 1 planned lessons based on the highest level of HELP, the "Real World." However, the students' only used sight and sound to learn about the trees in their environment. This lesson would be enriched by planning ways for students to use more of their senses during the lesson, as the next teacher has done.

Teacher 2: The teacher took the class on a nature walk around the schoolyard. During the walk, the teacher led a discussion about deciduous trees and asked students to pick up fallen leaves and explore their characteristics, feel the tree bark, and smell the fallen leaves at the base of the tree.

Differences in the lesson on deciduous trees were striking. Though both teachers planned a lesson on trees based on real world experiences, Teacher 2 planned ways to engage students through multiple senses. This lesson went beyond looking and talking about trees. Students were active participants in an experiential learning process where multisensory engagement makes possible more complex thinking and deeper understanding. Experiencing various characteristics of deciduous trees enables students to move beyond superficial discussions and rote learning to higher level activities where they can make comparisons, determine cause and effect, and formulate inferences. It is important to note that not all experiences promote the desired learning. Students who acquire schemata for discrete events with no opportunities to make connections among them lose critical opportunities to learn the material in a deep and lasting way.

Dewey warned educators against the indiscriminate use of experiences. In his book, *Experience and Education* Dewey writes, “The belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative” (1938, p. 13). He goes on to say, “...experiences may be so disconnected from one another that, while each is agreeable or even exciting in itself, they are not linked cumulatively to one another. Energy is then dissipated and a person becomes scatter-brained” (1938, p. 14). Planning for students to learn through concrete experiences must be balanced with other methods of instruction, carefully planned and sequenced. Teachers must keep the learning goals and objectives in mind to avoid a “scatter-brained” student outcome.

In an analysis of experiential learning, Hansen (2000) found that the following conditions must be met when considering materials.

1. Provide a balance of aural, visual, tactile, olfactory, and emotional stimuli.
2. Provide opportunities for observing, doing, or living through things.
3. At least a part of the learning process should be perceived to be controlled by the student.
4. When using materials, provide opportunities for analysis and reflection.
5. Provide opportunities for trial and error processes.

Observations of the Use of Materials in 507 Classrooms

In our observational study of 507 vocabulary lessons in K-3 classrooms we found that real world, artifacts, and representational materials were used 9.1% in language arts lessons, 42.6% in mathematics lessons, and 15.7% in science lessons. The use of concrete materials varied among school accreditation levels (Holmes & Holmes, in press):

High Performing Schools- 34.5%.

Successful Schools- 31.2%.

Schools on Academic Watch- 15%.

Schools at risk of failure- 11.8%.

Strategies for Using Concrete Materials to Support Learning

The involvement of students with materials, even real-world materials, does not have to be time consuming or costly. This section provides examples and teacher-tested ways to use materials in elementary and secondary reading and social studies lessons. Hats and costumes, as well as artifacts related to literature and social studies themes can be used to illustrate ideas and concepts. Furthermore, these materials add novelty that will catch the interest of the students. Sammie Thorell, a well-known librarian at Hernando Elementary School, uses costumes and props when she reads to her students. To support the reading of *Lily's Purple Plastic Purse* by Kevin Henkes, she has a purple plastic purse loaded with the contents listed in the story, for *Picky Mrs. Pickle* by Christine Schneider, she serves pickles and wears green, for *Piggy Pie*, by Margie Palatini she carries recipe cards and wears a long green fingernail.

The book, *Three Little Pigs*, is entertaining by itself. Add to it some real bricks, sticks, and straw, and the students gain a clear understanding about the properties of the building materials. As students interact with the materials and construct walls or small buildings, they glean information that can help them make inferences about why each pig selected different materials and what the wolf might have learned as he tried to get into each of the houses.

The popular story of the *Little Red Hen* can bolster students' understanding of the words, “grain,” “wheat,” “flour,” and “bread” when they have access to examples of each of them. When the Little Red Hen asks, “Who will help me thresh the wheat?” the children can answer, “I will!” When they explore pieces of grain, they can learn what it means to “thresh” as they work to separate the seed from the chaff.

For older students, a high school English teacher, Allison Movitz, involves her students through a variety of materials as they read literature from the Middle Ages and early 17th century. As her students read *Sir Gawain and the Green Knight*, *Beowulf*, and works by Shakespeare, she plans ways for them to represent their thoughts through art, drama, and music. Armstrong, 1994, p. 76 called this artistic expression of ideas and concepts “hands-on thinking.”

Through literature-based learning centers Movitz's students use a variety of materials to learn vocabulary and improve comprehension (Movitz & Holmes 2007).

Materials include construction paper, poster board, cardboard, scissors, yarn, rulers, material, thread, glue, markers, Styrofoam plates, pens and pencils, calligraphy pens and ink, acrylic paints, paintbrushes and sponges. She also provides books on clothing, art, and architecture. Her students make hennins, paper helmets, shields, and various types of swords, daggers, and other weapons. They create wood-cuts to stamp scrolls. Not all representations of the Middle Ages and early Renaissance literature are created through hands-on materials. Movitz's students also learn about storytelling, music and dances where their work becomes props for dramatic presentations of the literature.

Films and film clips are another way to involve students in reading literature and history (Holmes & Russell 2007; Holmes 2005). Foreign films with English subtitles promote reading and social studies content simultaneously. The sights and sounds are scaffolds for reading the subtitles. The following are ways teachers can use films to teach and clarify abstract ideas and concepts:

History: Some outstanding foreign films with English subtitles on the Jewish persecution during World War II are *Life is Beautiful* and *Au Revoir, Les Enfants*. Teachers can supplement the auditory and visual effects of both films with world maps, models of tanks and other military gear, and dramatizations.

Literature: *War and Peace* and *Beauty and the Beast* are literature classics available on subtitled films. *War and Peace* can be supplemented with maps and artifacts including religious symbols, military gear, and a copy of the "Treaty of Tilsit." Music such as Tchaikovsky's *1812 Overture*, and dances from the time periods of the films are ways students can learn about historical periods. Dramatizations of religious and military celebrations and Napoleon's brutal winter march through Russia will breathe life into the textbook accounts of these events. *Beauty and the Beast* uses unusual and grotesque decorations in the Beast's castle that students can reproduce to give them a better understanding of the time period and setting.

Rafe Esquith (2003), a 5th grade teacher famous for his innovative methods and high test scores, infuses the use of films and materials with classical literature. He engages students in the reading of literature including *Hamlet* and other Shakespearian plays, Steinbeck's *Of Mice and Men*, Mark Twain's *Tom Sawyer* and *Huckleberry Finn*, and Robert Louis Stevenson's *Treasure Island*. Esquith involves his students in activities supported by materials, to help them understand unfamiliar words and concepts. For example, before students read *Treasure Island*, they dress as pirates and go on a treasure hunt following a map of clues. Esquith formed the Hobart Shakespearian Club where students create props, plan lighting, compose and play original music, and put on a once-a-year performance of a Shakespearian play. In preparation for the play, some of the students learned how to fence using swords.

Conclusions and Reflections

With the increased complexities of a diverse student population and increased demands on schools to expand an already burgeoning curriculum to include subjects previously taught outside of school, HELP fills a need to provide a comprehensive, yet simple hierarchical checklist for teaching and learning for teachers in grades K-12. The names of the categories of materials are free from educational jargon that may interfere with immediate understanding and implementation. This article exhorts teachers to consider using more materials in their lessons. This involvement can be brief or lengthy depending on the lesson's objective. In our analysis of lesson plans, we found that teacher talk and textbooks comprised the majority of the lessons. HELP lists the possibilities; it is up to the teacher to make informed choices related to the materials they choose to meet the needs of their students. Excellent lessons are based on words alone, through discussion, lecture, and reading. We don't want to minimize their effectiveness, especially lessons that are carefully crafted and systematically planned.

However, when word-only lessons become the default condition, the way every lesson is taught, students miss vital opportunities for novel and enlightening ways to learn. Like most things in life, a balance is needed where students' active use of authentic materials is combined with oral and written instruction. Preservice teachers assigned to middle school and secondary classrooms stated that they didn't feel it was appropriate to "do all that cute stuff" with their students, and relied heavily on lecture and textbooks. Ironically, their written reflections from the journals they kept about their own learning showed that they overwhelmingly felt they learned more from the real-life experiences of the public school classroom than they learned from the lecture and textbooks. Preservice teachers must understand that this epiphany, born of experience, applies equally to the students they will be teaching.

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 Malle, L. (Director). (1987). *Au revoir, les enfants*. MK2 Productions: French, English subtitles
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 Music Tchaikovsky, P. I. *1812 Overture*

Figure 1. Lesson plan materials. Numbers shown indicate instances of the use of the various levels of HELP among the 977 objectives written by preservice teachers.

Real World	Artifact	Model	Visual	Written	Oral
8	128	68	178	370	225
0.82%	13.10%	6.96%	18.22%	37.87%	23.03%

Figure 2. Instances of student sensory involvement. Numbers shown in the boxes above indicate the instances students were involved in each of the five sensory modes among the 977 objectives.

Visual	Auditory	Tactile/ Kinesthetic	Taste	Smell
803	786	200	6	6

Figure 3. Materials hierarchy for lesson planning.

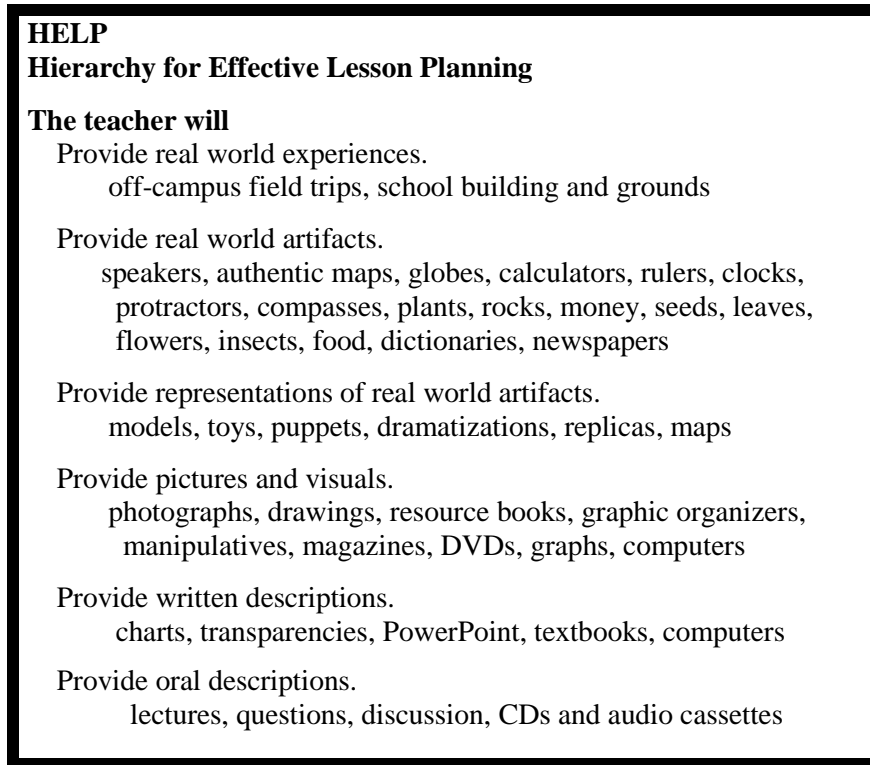


Figure 4. The optimal relationship between the levels of the hierarchy and the sensory engagement of the students with the material.

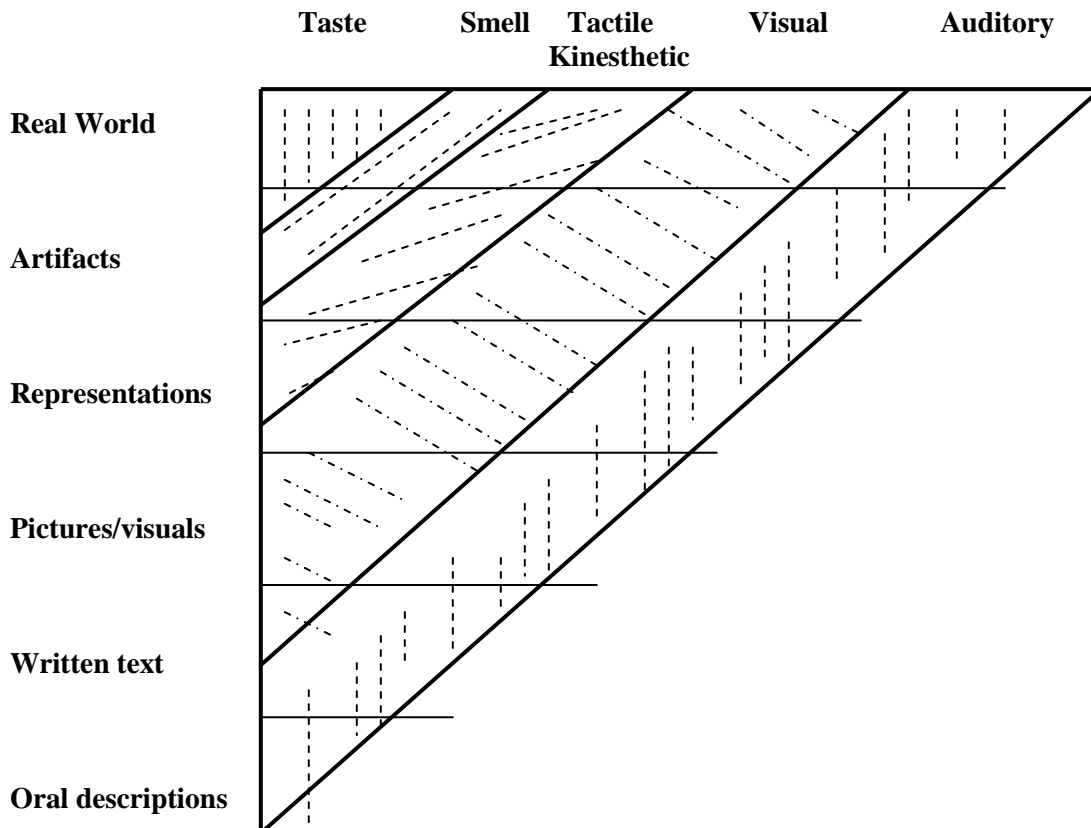
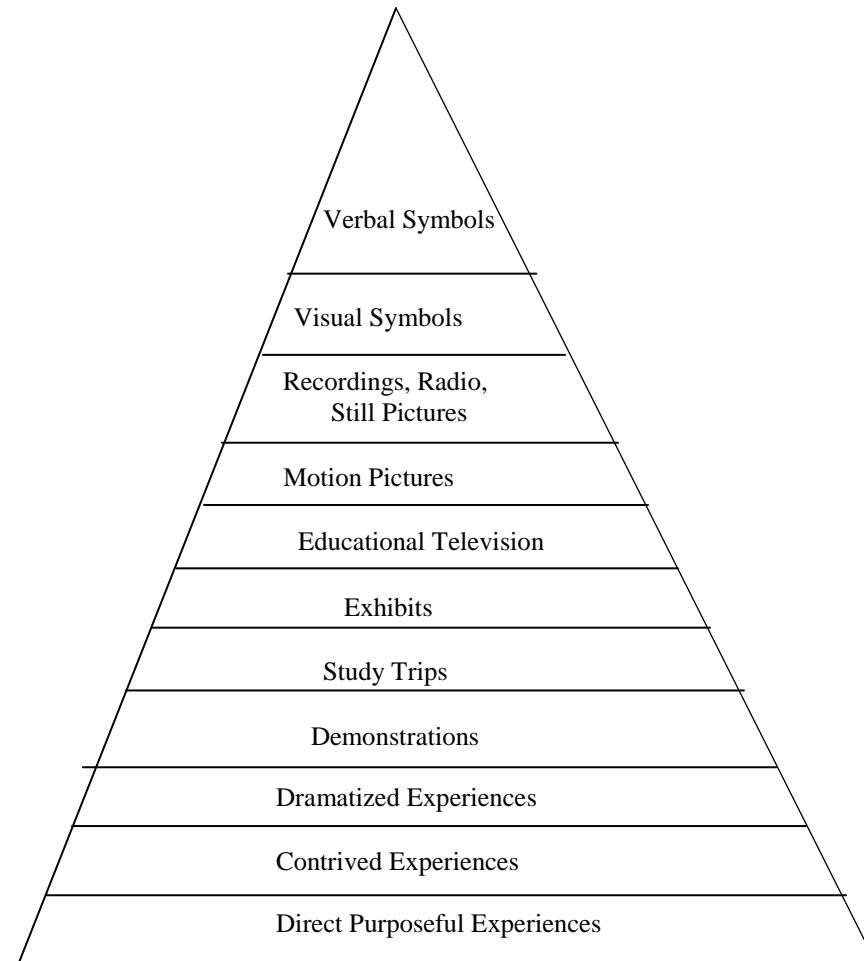


Figure 5. A comparison between Dale's Cone and HELP.

Dale's Cone of Experience, 1954



HELP 2011

The teacher will

Provide real world experiences.

Provide real world artifacts.

Provide representations of real world artifacts

Provide pictures and visuals.

Provide written descriptions.

Provide oral descriptions.